E/CONF.39/D/135
SUMMARY
25 Oct.1962
ORIGINAL : ENGLISH

UNITED NATIONS CONFERENCE
ON THE APPLICATION OF SCIENCE AND TECHNOLOGY
FOR THE BENEFIT OF THE LESS DEVELOPED AREAS

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Agenda Item : D.13

Australia

DEVELOPING THE STRUCTURAL USE OF NATIVE TIMBERS : IMPORTANT TECHNOLOGICAL FACTORS

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DEVELOPING THE STRUCTURAL USE OF NATIVE TIMBERS

IMPORTANT TECHNOLOGICAL FACTORS

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Sampling is of prime importance in the assessment of timbers for structural use. Methods recommended by some standard timber specifications, for instance, the taking of a large number of test specimens from a relatively small number of trees, are regarded as inefficient and uneconomical.

A quicker and more efficient approach is to take only one specimen of each type from each tree, and sample trees of a species on a step by step basis. For a quick assessment of each species it is often adequate to sample a few trees to obtain the strength properties to a precision of ± 15% of the species mean. If the species appears promising the sample can be increased to give a precision of ± 10%, and even ± 5% if the timber is likely to be of high economic importance.

It is essential that, at each step, the sampling should be properly representative of the population of trees of most interest to the wood technologists and, ultimately, to the timber users. Such a method has been found to increase up to 10-fold compared with other methods the rate of obtaining precise information on strength properties.

Where it is economically desirable to utilize a very wide range of timber species, as in Australia, the practice of dividing the timbers into a few strength groups, each of which has its own set of basic working stresses, has several advantages. Less precise information is required to allot a species to a strength group than to enable reliable working stresses to be derived for that particular species. The basis of the allocation of a species to a strength group is provided in the paper.

Assessment of the effects of defects on the strength of wood is essential to the safe and efficient use of timber for structural purposes. It is important that a critical examination be made of grading rules already in use in other countries before adopting them.

In the utilization of native timbers, particularly hardwoods, there are several factors affecting their efficient use sometimes to a critical degree. The higher density of the hardwoods and the consequent slower rate of seasoning generally lead to these timbers being used structurally in the green condition. Growth stresses in the living tree are generally at a higher level in hardwoods than in softwoods. They cause the defect known as "brittle heart" in hardwoods

and also lead to end splitting and to distortion on sawing.

The greater shrinkage of hardwoods and the tendency of some to "collapse" during seasoning require that special care be taken in structural design, but experience in Australia and elsewhere has shown that the use of suitable techniques can overcome all of the serious problems that might arise.

Special allowance in design stresses has to be made for the effect of long-duration loading, including the increased deflection in beams and columns resulting from changes in moisture content as structural members erected in the green condition dry out in service.

In order that tests on timber species should have maximum value, not only in the originating country but also to other interested countries, it is very important that all conditions of test be recorded and published with the test data. It is also important to establish properly the botanical identity of all timber tested. It is recommended that statistical methods be used in processing test results and that measures of variability, such as the standard deviation of individual results and the standard error of the estimated species mean value, be published.

The suggestion is made that a bureau be established for the co-ordination of technological studies in different countries, the examination of test data and the dissemination of information.

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